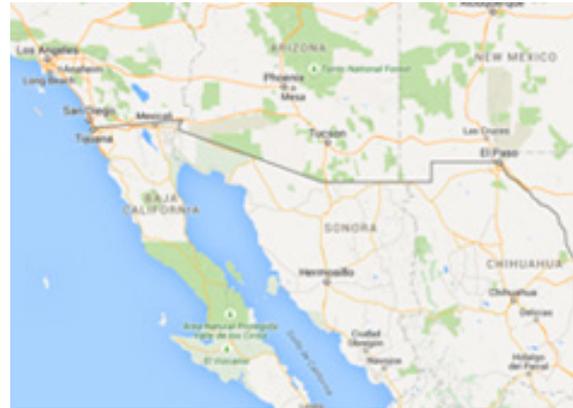


# The eye of the storm

Hurricane Odile has become —along with Olivia (1967)— the most devastating ever to hit the Mexican state of Baja California Sur. Its effects also extended to other areas of the Mexican Atlantic Coast and the southwest of the United States. Odile hit land on 14 September 2014 at category 3 (Saffir-Simpson scale). There were six dead and the material damage is estimated at about 2.5 billion dollars, approximately half of which (1.2 billion) was insured. Hotel infrastructure, the area's main source of economic activity, was seriously affected. The analysis of the damage to these establishments allows us to draw conclusions on the importance of preventing this phenomenon in the hotel sector.

## THE GEOGRAPHY

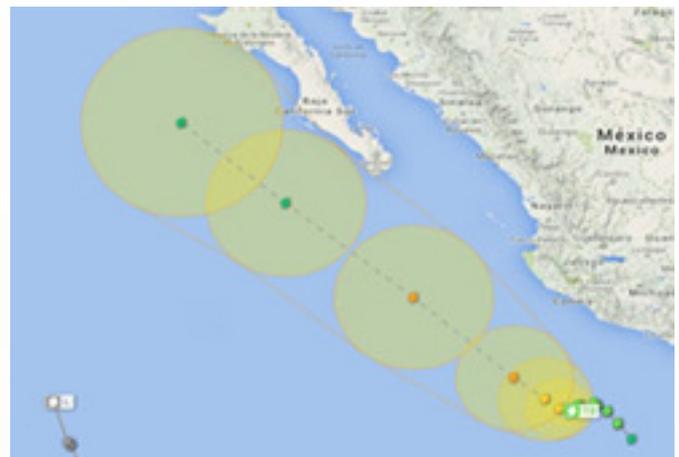
To properly understand the damage caused by and the progress of this event, we should take into account the geographical set-up of the state of Baja California Sur, a long peninsula running parallel to the Mexican Pacific coast, which gives rise to the Gulf of California (Sea of Cortés). It is an area with very low rainfall, where the main economic activity is sun-and-sea tourism, along with —to a lesser extent— fishing and agriculture.



## THE PHENOMENON

Like other hurricanes that end up being a devastating phenomenon, Odile started out as a tropical cyclone. It started in the Mexican South Pacific and, in barely four days, evolved into a category 4 hurricane, with maximum sustained winds of 215 km/h. On September 14 (9.45 pm, local time) it hit land after its speed decreased slightly to 205 km/h (category 3). The initial NHC<sup>1</sup> forecast established a path for the hurricane parallel to the Baja California peninsula but away from it; however, it took a surprising change of direction that focused the eye of the storm right on the tip of the peninsula, the area called Los Cabos. This situation meant that alert levels in the area were deployed late and many tourists could not leave the area; resulting in hotels giving refuge to 30,000 tourists (26,000 foreigners), which meant 46 percent hotel occupation at the time the hurricane hit land.

Expected path



Actual path



<sup>1</sup>NHC: National Hurricane Center



## Saffir-Simpson hurricane scale

Tropical cyclone	Wind speed	0-62 km/h
	Tide	0 m
	Central pressure	>980 mbar
	Level of damage	Rain that may cause serious damage and even flooding.
Tormenta tropical	Wind speed	63–117 km/h
	Tide	0–3 m
	Central pressure	>980 mbar
	Potential damage	Heavy rainfall that can cause devastating floods. Strong winds that may generate tornadoes.
When the intensity of a tropical cyclone exceeds the classification of tropical storm, it becomes a hurricane. The five categories, in ascending order of intensity, are:		
Category 1	Wind speed	119–153 km/h
	Tide	1,2–1,5 m
	Central pressure	980–994 mbar
	Level of damage	Without damage to building structures. Damage caused basically to unmoored houseboats, shrubs and trees. Flooding in coastal areas and small-scale damage in ports.
Category 2	Wind speed	154–177 km/h
	Tide	1,8–2,4 m
	Central pressure	965–979 mbar
	Potential damage	Damage to roofs, doors and windows. Significant damage to vegetation, mobile homes, etc. Flooding in ports and breakage of small moorings.
Category 3	Wind speed	178–209 km/h
	Tide	2,7–3,7 m
	Central pressure	945–964 mbar
	Potential damage	Structural damage to small buildings. Destruction of mobile homes. Flooding destroys small buildings in coastal areas and drifting objects may cause damage to larger buildings. Possibility of flooding inland.
Category 4	Wind speed	210–249 km/h
	Tide	4,0–5,5 m
	Central pressure	920–944 mbar
	Potential damage	Widespread damage to protective structures, roofs falling off small buildings. Heavy erosion of embankments and beaches. Inland flooding.
Category 5	Wind speed	≥250 km/h
	Tide	≥5,5 m
	Central pressure	<920 mbar
	Potential damage	Complete destruction of roofs on some buildings. Flooding may reach the first floors of buildings near the coast. Mass evacuation of residential areas may be required.

## THE DAMAGE

The hurricane caused damage to the largest towns in the region (San José del Cabo and Cabo San Lucas). The storm's impact left 92 percent of the state's population without electricity (239,000 people), apart from significantly affecting the water supply and telecommunications. The number of dwellings affected was about 25,000. Urban infrastructure, roads and the airports of San José and Cabo San Lucas were also damaged. The fact that the latter were out of operation, along with the bad conditions of the roads, was a significant handicap when it came

to bringing urgent aid into the devastated area.

In addition to the loss of six human lives, the direct and indirect damage was estimated at 2.5 billion dollars, of which approximately half (1.2 billion) was insured.

Apart from the damage caused by Odile, we have to consider the episodes of vandalism and looting that happened in the hours immediately following the passage of the hurricane before the arrival of the army in the area and the declaration of martial law.

## MAPFRE

MAPFRE, a company with significant insured interests in the area, set up a Crisis Office right at the start to develop an Action Plan and send expert personnel to the affected area. Through contacts with the different Mexican administrations, this enabled the different adjusters to be sent to the area during the most delicate phase after the passage of the hurricane so that they could begin their work as soon as possible. Close contact was also established with the insured parties, conveying a message of confidence and support to better solve the situation.

## HOTEL INFRASTRUCTURE

The Los Cabos coast is dotted with a large number of hotels belonging to international chains, which bring a good share of the economic activity to Baja California Sur. The location of these kinds of hotels on the beachfront means that they are the first buildings affected by hurricanes when they hit land, which coincides with the moment when the storms have the greatest destructive potential, which later progressively subsides.

The **material losses** in the hotel infrastructure were focused, as usual, on the damage caused by the force of the **wind**: broken walls and roofs, destruction of outside areas, gardens and beach, and damage caused by **water** (flooding, dampness) to technical installations, furniture and decorative items, linens, etc.



*Destroyed linens and fittings*



*Daños en el interior de una habitación.*

Business interruption and the resulting **Loss of Earnings** approached 100 percent of hotel activity in Los Cabos for the first few weeks after the passage of Odile. One month later, the first hotels began to open their doors again, as the airports, roads and electricity supply began to restore a certain degree of normality. However, it took several more months to restore activity to pre-hurricane levels.

### LESSONS LEARNED

#### Construction aspects

With some exceptions, tropical cyclone phenomena do not significantly damage building structures, this being understood to be the skeleton of the building; however, **walls and roofs** may be significantly affected depending on the type of material used. The passage of the hurricane revealed that solid materials (concrete, brick) show acceptable behavior, very different to the light materials, such as fibrous silicate panels, known locally as tablaroca (Sheetrock). This material is mainly used in the construction of interiors and some facades of hotel buildings in the area of Los Cabos.



*Facade built with light materials.*



*Damaged sheet rock panelson.*



*Facade and roofs of open areas.*

One of the most recurring problems in hotel buildings was due to **broken windows** as, even if the outer walls are sufficiently solid, once the level of resistance of the windows is exceeded, the force of the wind and water causes widespread damage in the rooms, including inner walls when they are made from light materials.



*Damaged room.*



*This cyclone shutter stopped the window at the venue from being broken.*

**Cyclone shutters** are an efficient barrier for limiting interior damage, as shown in the cases analyzed and evidenced by the importance of having these types of measures. In other cases, the windows were protected with wooden boards which, although effective in many cases, did not guarantee a high level of effectiveness in the areas more directly exposed to the force of the wind.

## Incident observatory

The strong gusts of wind (around 200 km/h) in many cases managed to pull the **tiles** off the roofs and turn them into projectiles that hit facades and other nearby roofs, breaking the waterproof layer and causing subsequent damage due to water ingress. The use of imitation tiles built from sheets of concrete considerably limited damages caused by this on the buildings analyzed, as their greater weight and resistance prevented them from being lifted off by the wind.



*Traditional tiles lifted by the force of the wind.*



*Fake tiles (concrete) not affected.*

## ASPECTS OF HUMAN ORGANIZATION

**Emergency Plans** are of the utmost importance when it comes to limiting personal injury and material damage in hotels. In the case of hurricane Odile, in spite of the scant margin available due to the unexpected change in the hurricane's path, the hotels implemented the actions planned for this kind of event with a generally satisfactory outcome, which allowed 30,000 guests to be safely accommodated. In many cases, the tourists were confined to common areas of the hotel and, in others, in the less exposed areas, they were allowed to stay in their rooms. Apart from coordinating the safety of the guests, preventive actions were implemented in the phase prior to the arrival of the hurricane, such as:

- Window protection (wooden boards, cyclone shutters).
- Program for shutting down certain technical installations.
- Anchoring outdoor equipment and structures.
- Moving equipment or parts of the installations to protected areas.
- Protection of flood-prone areas.
- Preparing generators and stocking fuel.
- Backup copies (records, software, etc.).



*Flooded area.*



*Desalination plant at hotel affected by the ingress of salt water and sand.*

## Incident observatory

One —equally important— aspect of human organization with regard to this type of catastrophic event is the **business continuity or Contingency Plan**. The speed and efficiency with which the first actions are undertaken may make a very significant —often critical— difference for returning to normal and limiting the loss of earnings due to the interruption of activity. We must take into account the special situation that occurs after an incident of these characteristics, totally affecting a certain area, where all types of communications are interrupted

or greatly affected and where the possibility of obtaining materials and qualified personnel for rebuilding is very difficult due to the enormous demand and scarcity of resources.

One important aspect to consider within the contingency plan is the involvement of the hotel's own staff in restoring and cleaning the facilities. In this regard, any possible professional incompatibility that may be established by the legislation of each country for undertaking these tasks must be taken into account.



*Personal de un hotel realizando labores de limpieza de mobiliario.*

In addition, in order to facilitate the work of the adjusters, the inclusion of updated detailed information in the contingency plan with a breakdown of insured assets proved to be very advantageous. ■

### CONCLUSIONS

The analysis of the damage caused to the hotel infrastructure after the passage of hurricane Odile reveals common lines for all establishments that confirm the effectiveness of the most important well-known preventive measures for this type of phenomena. They are mainly based on appropriate **building conditions** according to the type of catastrophic risk that is foreseeable in the area, and efficient and smooth **human organization**, which allows for acting without improvisation, both in event preparation and after the activity returns to normal.